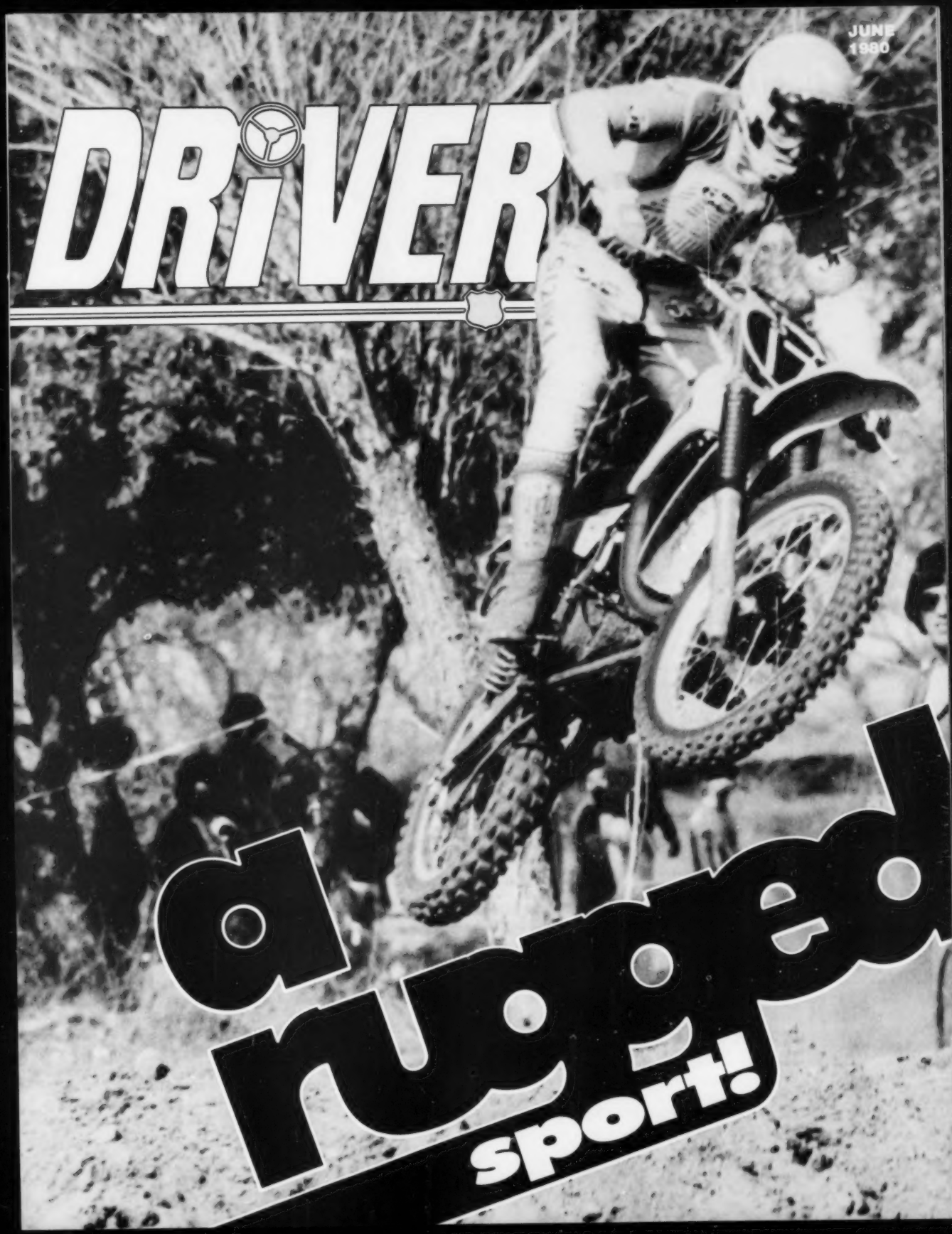
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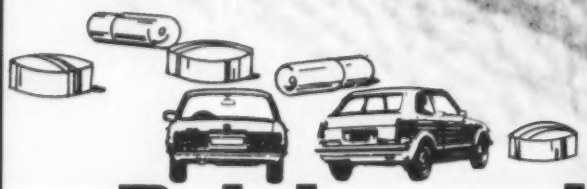


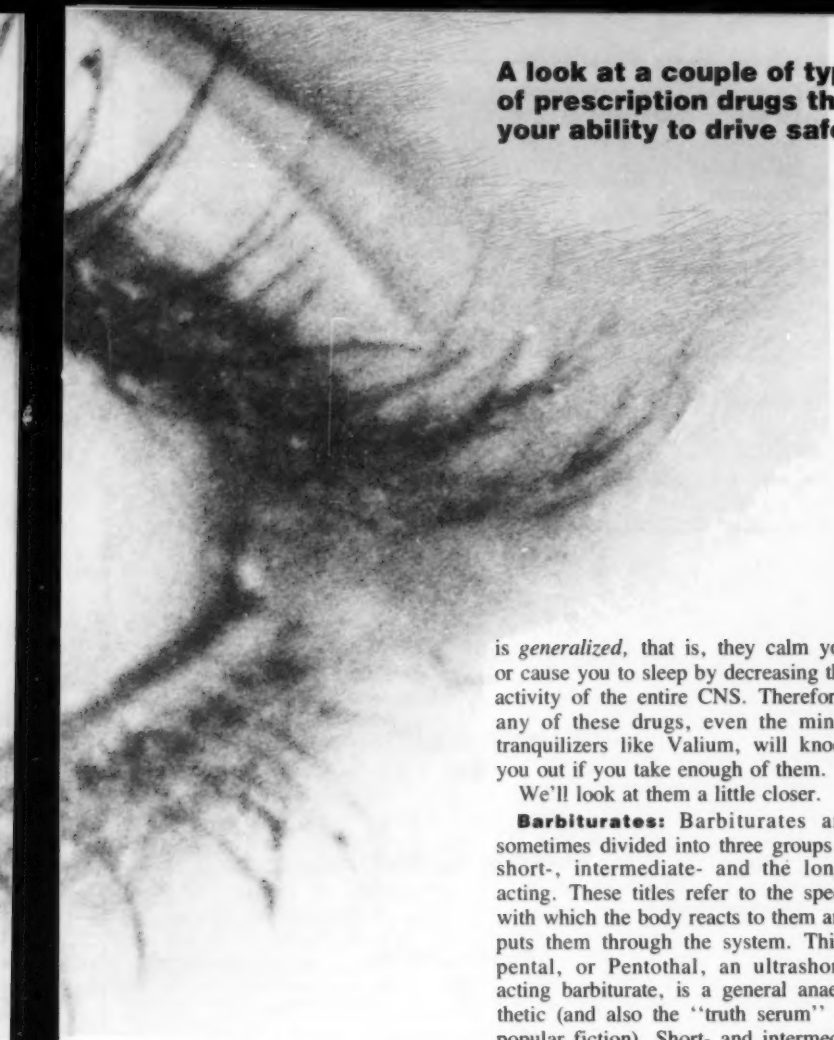
Driving and Sedatives

In the introduction to "Drugs and Driving," a special edition of the journal *Accident Analysis and Prevention*, Dr. Herbert Moskowitz writes, ". . . Statements about the effects of drugs in general with regard to driving safety can rarely be made . . . Our knowledge is quite limited even in the most frequently studied of these drug classes. . . . However, despite the incompleteness of the data base, it appears that at least three out of the five classes of drugs discussed are likely to lead to impairment of driving skills, namely, tranquilizers, barbiturates and cannabis."

We examined the effects of cannabis, or marijuana, in the February 1979 DRIVER, "Driving Stoned," and now we'll look at the other two on that list.

Barbiturates and tranquilizers belong to the group of drugs known as depressants of the central nervous system (CNS). Alcohol is another member of this group, and it, of course, presents a worse problem than the others. But it is commonly recognized as a danger, and much is written about it.

We found this statement very meaningful: "At the moment, although we seriously try to prevent individuals from driving while under the influence of alcohol, we are not yet serious about restraining individuals who ingest tranquilizers – presumably because legal guidelines for what may be considered safe blood levels of sedatives have not been established and because



A look at a couple of types of prescription drugs that could seriously affect your ability to drive safely.

of a prevailing lack of awareness among the public that tranquilizers *do* impair concentration. The influence of alcohol, by contrast, is widely publicized.''*

This, then, will be an attempt to establish some awareness of this problem on the part of you readers. We will examine alcohol in a separate article later this year.

Getting back to the main subject, you'll notice the word ''sedative'' in the above quote. Barbiturates and tranquilizers also belong to a group of drugs called ''sedative hypnotics.'' Sedatives are calming agents and hypnotics are sleep inducers. A slang expression is ''downers,'' and it is a fairly good description of their action. Their effect is *generalized,* that is, they calm you or cause you to sleep by decreasing the activity of the entire CNS. Therefore, any of these drugs, even the minor tranquilizers like Valium, will knock you out if you take enough of them.

We'll look at them a little closer.

Barbiturates: Barbiturates are sometimes divided into three groups—short-, intermediate- and the long-acting. These titles refer to the speed with which the body reacts to them and puts them through the system. Thiopental, or Pentothal, an ultrashort-acting barbiturate, is a general anaesthetic (and also the ''truth serum'' of popular fiction). Short- and intermediate-acting ones such as amobarbital (Amytal), secobarbital (Seconal) and pentobarbital (Nembutal), are used to treat tension and anxiety, or as sleeping pills. Long-acting barbiturates like phenobarbital (Luminal) are used to treat tension, hyperactivity, insomnia and epilepsy.

The specific effects of barbiturates, of course, depend on the kind and the amount of the drug one takes. Barbiturates will relieve anxiety and tension, calm the user and relax his muscles.

A larger dose (or a stronger type) will depress the action of the skeletal and heart muscles, slow the heart rate and breathing, lower the blood pressure, slur the speech, and cause staggering and deep sleep. It will act on the nervous system by decreasing the action of the nerves, causing confusion, a lessened ability to think and concentrate (and therefore work), weakened emotional control and slowed responses and reactions.

Does all that sound like drunkenness? It's not surprising, because the appearance of the drunk and the person on barbiturates will be similar. The outward difference will be the lack of alcohol breath on the latter.

Dr. Satanand Sharma of the University of California at Los Angeles says, ''Barbiturate intoxication, similar to alcohol intoxication, is often accompanied by impaired thinking, lack of emotional control, aggressive behavior, motor incoordination, and drowsiness. These effects make barbiturates potentially dangerous in terms of driving.'' (We should note here that the barbiturate reactions we have listed are the common ones; however, in some people the drugs cause different behavior, for instance, excitement or pain.)

In his survey of the studies of barbiturates and driving, Dr. Sharma found that there are varying estimates on the involvement of the drugs in traffic accidents. One survey found

Barbiturates act on the nervous system by decreasing the action of the nerves, causing confusion, a lessened ability to think and concentrate, weakened emotional control and slowed responses and reactions.

(A Primer of Drug Action, Robert M. Julien, pp. 55-56.)

continued

THE EDITOR SPEAKS
DOUBLE CLUTCH

THE HIGH COST OF DRIVING

Are you driving fewer miles today than you were a year ago? If so, you're in good company. Nine out of 10 Americans say they have reduced their mileage, particulary for weekend and social driving.

Three out of four car owners polled said they could cut back another 10% or so, but 25% said they cannot reduce their driving further. This poll (conducted by Gallup for The Highway Users Federation) also showed that 20% of those who drove to work alone last year are now either car pooling or using public transportation.

Virtually all drivers surveyed gave the same reason for reducing the miles they drive: The high cost of gasoline.

Gasoline prices are increasing for one reason that has nothing to do with the price of crude oil. That reason is state fuel taxes. Seven states—Indiana, Kentucky, Minnesota, Nebraska, South Dakota, Virginia and Wisconsin—have hiked motor fuel taxes so far this year. As this is written most state legislatures are still in session and action on motor fuel taxes is pending in Alabama, Arizona, Florida, Kansas and Mississippi.

Some states are also shifting the method of figuring their tax. For instance, Indiana changed from a straight 8¢ per gallon to 8% of the retail price (up to $1.50 per gallon retail) for an effective maximum tax of 12¢ per gallon this year. The tax can be increased to 16¢ after 1981 if the price rises to $2 per gallon. Kentucky's new computation means the tax can rise to 13½¢ through June 1982 and then increase 10% a year with the price of fuel, but it cannot fall below 9¢.

The state taxes (no longer deductible on federal income tax returns) are increasing because legislatures must generate funds for maintenance and construction of roads. Costs for roads have roughly doubled in the past five years. Meanwhile, our total highway expenditures per vehicle mile have dropped off 52% in the past 10 years. Underinvestment has put our highway network on a steady downhill course.

JUN

VOLUME 14 NUMBER 1

CONTENTS

Features

Driving and Sedatives **1**

1980 Vacation Planner **8**

Protecting Yourself From The Drunk Driver **10**

When You're Stopped By Police **12**

A Rugged Sport for Competitors **14**

The Motorcycle Roundup **18**

In The Key of "B" **Back Cover**

Departments

Double Clutch **2**

Double Tech **16**

The 5th Annual DRIVER Trivia Nostalgia Test **20**

The Backyard Mechanic **22**

Backfire **28**

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". . . the sleeping pills and the barbiturates . . . are the things to watch out for most of all, following which are the tranquilizers and marijuana."

4.4 percent of the U.S. between age 18 and 74 use barbiturates. Other surveys estimated 12 percent of high school students are users and between 17 and 19 percent of college students.

The studies of accidents have found between 2.5 percent and 9 percent of single car fatal accident victims were using barbiturates. The estimates for multiple-car accidents were even more varied – between 1 percent and 9.3 percent. Dr. Sharma cites the many differences in the studies, including the different methods of screening for the drugs, as the reason for the variance.

However, he writes, "If barbiturate involvement in traffic accidents does approach the 9% figure reported . . . then barbiturates are clearly overrepresented in the driving-accident population. It should also be noted that barbiturates are generally taken as sedatives and sleeping pills at night; and hence the at-risk driving population should contain a lower proportion of persons under the influence of barbiturates than that in the total population of drivers."

Aside from these studies of actual accidents, much research has been accomplished on specific physical processes that relate to driving ability. Various experiments have shown that barbiturates decrease control of muscle movements and that they also affect hand steadiness. Reaction times, both to audible and to visible signals, are slowed under barbiturates.

Other experiments have shown that visual-motor (e.g., hand-eye) coordination is decreased under the influence of barbiturates. Simple word and math tests have been used to reveal that the barbiturates decrease the speed with which people process information.

The list goes on. Barbiturates interfere with the ability of the eyes to follow moving objects, and with the ability to perform tasks that require a division of attention.

Sharma cites simulator tests (both driving and flying) which show a decrease in performance even hours after taking the drugs. In another experiment, with an actual driving course, subjects showed "significantly impaired driving ability" two hours after taking barbiturates.

He concludes, "Clearly, barbiturates degrade skills which are components of driving Reaction times increase and performance of a variety of skilled tasks are impaired. This indicates that driving may be severely impaired under barbiturates. . . . The laboratory evidence . . . suggests that it is unsafe to drive under barbiturate influence. The effects appear at moderate doses and appear to be long-lasting." However, he cautions that the case studies of fatal auto accidents do not give a clear indication of the problem, because of different methods in conducting the research.

Tranquilizers: Although there are many different tranquilizers, there are two main categories – major and minor. The major tranquilizers, or "neuroleptics," are used in the treatment of mental illness. Examples of these are prochlorperazine (Compazine) and chlorpromazine (Thorazine).

The minor tranquilizers are some of the most popular drugs in the world. They include meprobamate (Equanil, Miltown, etc.), hydroxyzine (Atarax, Vistaril), chlordiazepoxide (Librium) and diazepam (Valium), among many others. The last two in that list, Valium and Librium, are members of a group of drugs called benzodiazepines – 68 million prescriptions for benzodiazepines were written in 1978. In the mid-1970s, 50 million prescriptions for Valium were written each year. It is *the* most popular prescription drug. It has been estimated that 2 million people take the drug regularly.

Minor tranquilizers are used to treat anxiety, tension, muscle pain and tension, and high blood pressure.

Tranquilizers affect that part of the brain that controls emotional reactions and alertness. The usual dosage will make the user feel relaxed, and it will lessen his anxiety and tension. A higher-than-normal dose will make the user drowsy, and he might also feel a depression of the central nervous system and the muscles, and a reduction in his ability to concentrate. A high dose will intensify these effects and create symptoms that resemble drunkeness.

Dr. Markku Linnoila, writing in his paper "Tranquilizers and Driving," reports that many (perhaps most) people use their prescribed drugs on an irregular basis, rather than as prescribed.

". . . we are not yet serious about restraining (that is, preventing from driving) individuals who ingest tranquilizers – presumably because . . . of a prevailing lack of awareness among the public that tranquilizers do impair concentration."

continued

Barbiturates interfere with the ability of the eyes to follow moving objects, and with the ability to perform tasks that require a division of attention.

He comments, "In some cases the irregular administration of a drug can even be advantageous because one may thus be able to prevent its accumulation in the organism or avoid the development of tolerance. On the other hand, the organism is incapable of adapting to some of the side effects of a drug administered irregularly. Every dose can cause a new process of adaptation and during this adaptation there may be an increased accident risk."

Linnoila cites a study in an Oslo, Norway, hospital that discovered "significant amounts" of Valium in blood samples of 11 percent of people injured in auto accidents. Another 7 percent had Valium and alcohol combined.

Speaking of benzodiazepines, he says, "Because tolerance develops to the desired effects of the drug, the abuser is liable to increase the dose. Some of the side effects of the drug are not diminished in the same amount as the desired ones, and an abuser of tranquilizers obviously is a risky driver."

Linnoila says the laboratory studies of tranquilizers show they decrease the information processing ability of the brain and also affect hand-eye coordination, both functions necessary for safe driving. In the case of the neuroleptics, after the body has adapted to the drugs, the information processing capability is no longer seriously affected. However, Linnoila

continued

in the Lab

Laboratory research such as that cited in this article is a prime interest of Dr. Herbert Moskowitz. Moskowitz is a noted expert in the field of drugs and their effect on driving. He has published a number of studies on marijuana and driving skills, some of which we quoted in our article on that subject, "Driving Stoned" (February 1979 DRIVER).

Moskowitz founded the Southern California Research Institute (SCRI) in West Los Angeles to study the effects of a variety of stressful conditions on human performance, and especially the effects of drugs on driving performance. The Institute, a non-profit organization, receives most of its operating funds from government grants, but also from groups like the Insurance Institute for Highway Safety and the American Automobile Association.

The researchers at the Institute administer sedative drugs to their volunteer subjects and then put them through a computer-generated driving simulator to test the effects of the drugs.

The subjects are tested thoroughly to determine the level of the drug in their system. "We do blood and urine testing here," said Moskowitz. "The urine testing is mostly to make sure the drug we administer is the only drug they're using. It's just to keep them honest."

The drugs that are tested at the Institute are mostly sedatives: Valium, Librium, secobarbital, methaqualone ("Quaaludes"), marijuana, diphenhydramine (which is an antihistamine), Dalmane (a sleeping pill), and others. They have even studied the driving behavior of patients on a methadone treatment program, although the Institute itself did not administer that drug.

Dr. Herbert Moskowitz of the Southern California Research Institute has done many studies of the negative effects of drug usage on safe driving.

In the case of the SCRI-administered drugs, some subjects are given "placebos," or phony drugs, so that they will not know if they are on a drug or not.

Moskowitz said the greatest impairment from the drugs is seen in the subjects' ability to recognize dangers in the environment, such as obstacles in the road or movements of other vehicles. Tracking abilities are also affected, though not to so great a degree. When one is driving one doesn't stay in one spot within the lane but has a general positon around which one moves.

"Under many of these drugs," says Moskowitz, "the 'excursions' get wider and wider. Your lane position excursions get greater; you have more variability. That indicates you have less control. Sometimes the variability is so great that the subject goes over into another lane.

"Typically the thing that's affected most readily is picking up dangers in the environment—seeing what other cars are doing, seeing what's happening to traffic signals, pedestrians and things like that. That gets affected first and foremost—picking up the things around you that are portentious of danger."

Moskowitz said the drugs that will cause the worst impairment in performance are "dose related", that is, the amount of impairment will depend on the amount of the drug used.

"In dosages that people normally utilize, the sleeping pills and the barbiturates are very strong and are probably the things to watch out for most of all, following which are the tranquilizers and marijuana."

He cautioned against too many generalizations on the subject. "It's like saying 'Is alcohol worse than some of the drugs?' Well, *how much* alcohol? You have to take into account the dosages that people use."

He said the difficulty in the research lies in the variables involved in dosage, including not only the kind of drug used, but the amount of it, the condition of the person, "when you give it in relationship to when they've eaten. All those are factors which are important. What we can say is whether a drug is dangerous and how its degree of danger increases as a function of dose.

"I can't predict what dose level I'm going to meet on the road. A lot of these drugs are important for social usages. We're not going to stop using tranquilizers, but we might want to restrict our driving. We might want to dose ourselves so that we give ourselves the main dose after we come home after work instead of in the morning."

Research such as that done at SCRI "will affect how we utilize drugs and it'll also affect the search for other drugs that might have the same therapeutic properties but less side effects."

Side effects are an important consideration, because as the individual develops a tolerance for the drug he is using the main effect becomes harder to establish, but the side effects somehow remain.

Computer Simulator

The Southern California Research Institute has one of the standard driving simulators with a filmed driving course, in addition to instruments which measure individual driving-related skills. But it also has a less common type of simulator, one that is run by computer.

The driver sits in the seat of a 1965 Rambler that has been cut in half and connected to the computer so that the driver is in complete control of the simulation. He can drive as fast or as slowly as he likes, and he can drive anywhere he likes, including off the road.

The course itself is projected onto a large screen in front of the car. The computer moves the image to simulate the movement of the car and it is a very convincing simulation.

The simulator tests the ability of the driver to maintain his lane position in normal straight-line driving, and also on curves in the road. There is even a portion of the presentation that simulates wind gusts which threaten to blow the car around. Other skills tested by the simulator are the ability to maintain a fixed following distance, to avoid obstacles in the road, and to pass a car in the face of oncoming traffic.

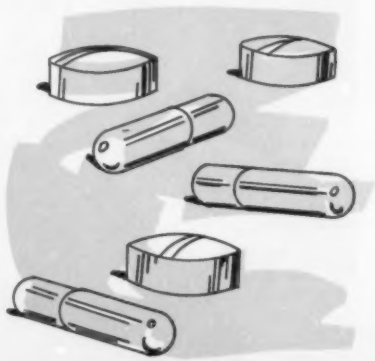
There are traffic signals and various lights around the car to simulate following traffic and cross traffic.

The course is not an easy one, as I discovered upon taking the wheel. The programmers of the computer have incorporated enough factors to make the course almost as complex as real driving.

The subjects for the drug experiments are given four to five hours of training on the simulator before they are given any drugs. In this way, they can become accustomed to the controls, and the computer can get a "score" for their driving ability when unimpaired by drugs. The results of their preliminary runs are stored in the computer for comparison with their scores after using the drugs.

Since a simulator is not as stressful a situation as real-life driving, the Institute uses money as an incentive to insure the subjects will drive as well as they are able under the influence of the drugs. The subjects are paid an hourly wage for their work, and they are paid more if they do well in the drug tests.

The computer simulator is "driven" from the seat of a car at the Southern California Research Institute. Ms. Jinx Beers, who runs the computer, shows our feature editor how it works.



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"Because tolerance develops to the desired effects of the drug (benzodiazepines) . . . (and) some of the side effects of the drug are not diminished in the same amount as the desired ones, an abuser of tranquilizers obviously is a risky driver."

warns that irregular use of these drugs causes renewed adaptation phases. He cited studies that show antidepressant drugs such as doxepin and amitriptylin affect information processing in some people.

The dangers of the benzodiazepines lie in long-term use. One study shows the drugs build up in the system and their beneficial effects were lost while the side effects increased. However, even one dose of the drugs can affect performance, as shown in another study on emergency avoidance on a driving simulator.

Linnoila cautions that benzodiazepines used as sleeping agents, flurazepam (Dalmane) and nitrazepam (Mogadon), can cause impaired driving performance the morning after, with regular use.

He also cites studies that suggest benzodiazepines affect "complex eye-hand coordination tasks requiring self-assessment of one's skills," and that they are "the class of tranquilizers which is commonly associated with accidents."

Linnoila concludes, "As a driver one should be especially careful at the onset of a drug treatment. In the optimum case one should abandon driving for the first 7 to 10 days of treatment. Then the situation could be evaluated with one's doctor before driving is resumed. This is necessary because the effects of a particular drug on a particular patient are hard to predict without sophisticated methods which are not generally available in out-patient practice."

While we don't know about his suggestion to abandon driving, we think the direction of the advice – to follow the directions from the doctor – is good. If a doctor prescribes a drug for you and tells you not to drive for some period, listen to him. Make sure you know the effects the drug is supposed to have, and any possible side effects. Report to the doctor any adverse reaction to the drug. Any of these could negatively affect your ability to drive safely.

Jeri Rood

(left)
The computer creates an image of a roadway, complete with speed limit signs, road obstacles, cars to follow and oncoming traffic.

(below)
The "road" is picked up by a camera (right) from a computer terminal screen.

Synergistics

We have gone into some detail on a couple of classes of prescription drugs. They can sometimes seriously affect your driving. But we can't leave this discusion without a look at another problem—the mixing of drugs. This is an all-too-common problem, both with drug abusers who want to get a "more interesting high," and with those people who just don't think before they take the drugs.

Mixing of drugs sometimes creates a condition called a "synergism," in which the total is more than the sum of the parts. Thus, with two different drugs, you may not get twice as high, you could get three or four times as high.

And it's not just a question of being "higher." The FDA Drug Bulletin reports the combined effect of alcohol and drugs accounts for around 2,500 deaths and 47,000 emergency room admissions each year.

The Bulletin reports, "Of the 100 most frequently prescribed drugs, more than half contain at least one ingredient known to interact adversely with alcohol." These include sleeping pills and tranquilizers, which we've talked about in the main article, as well as aspirin and acetaminophen (Tylenol).

So let's talk some more about alcohol and these drugs. Tranquilizers increase the depressant effects of alcohol, and vice versa. Particularly bad is the combination of alcohol and diazepam (Valium), which can make the user tired, confused and unable to concentrate.

The Addiction Research Foundation of Ontario (Canada) reports, "It may be dangerous to drive a car or operate some other kinds of machinery while affected by minor tranquilizers. The risk is much greater if alcohol or certain other drugs have also been taken. Minor tranquilizers intensify the effects of drugs such as alcohol, barbiturates, and opiates."

Alcohol can also increase the action of barbiturates in depressing the central nervous system. It takes less than half the amount of barbiturates to cause death when combined with alcohol as it does when the drug is taken alone.

Both kinds of drugs can have the same synergistic effect with alcohol even hours after the drugs are taken. For all of these reasons, alcohol should be avoided when you are taking prescription drugs—*especially* if you plan to drive.

But did you note above the mention of the ordinary analgesics, aspirin and acetaminophen? Those are simple, over-the-counter remedies. And those aren't all. Even the antihistamines, contained in over-the-counter cold and allergy medications, should not be combined with alcohol. To do so could cause extreme drowsiness, which is dangerous when driving.

Our best advice is to avoid alcohol when taking *any* drug, no matter how harmless it might seem to you.

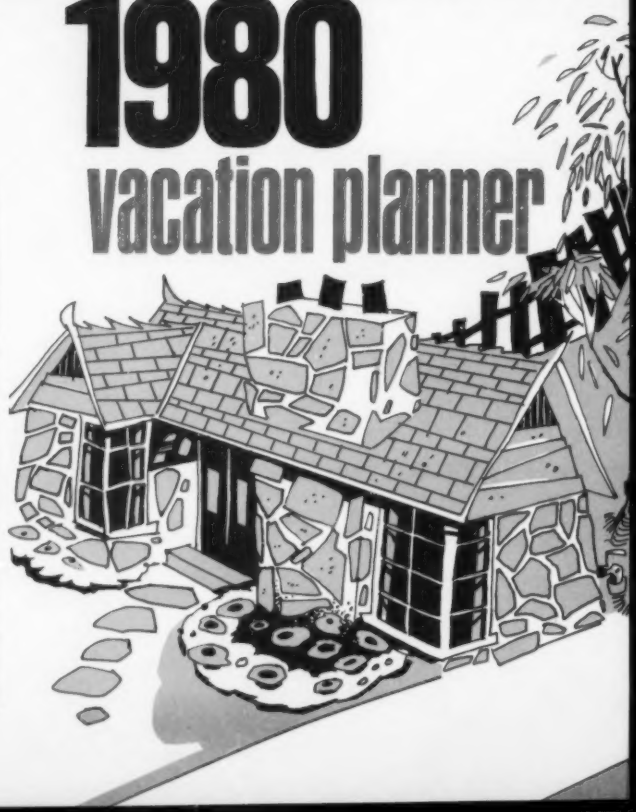
(left) **The equipment** behind the simulator screen projects the road, the ground and horizon and the road signs. (right) **The result** is an involved display that will test the driver's skills. This is taken from the left of the car. At lower right is the hood, top is the traffic light and at left is one of the lights to simulate cross traffic.

"Under many of these drugs," said Dr. Moskowitz, "your lane position excursions get greater . . . That indicates you have less control."

Editor's note: Some of the information for this article was taken from a special edition of the journal *Accident Analysis and Prevention*, entitled "Drugs and Driving." It contains several good surveys of the literature about drug effects on driving skills. Readers interested in more information on the subject should start there.

Vacation at home! Look at all the pretty pictures you took on last year's trip! If you don't feel comfortable unless you're behind the wheel, by all means get a wheel, like our friend did here.

1980 vacation planner



It's that time of year

Okay, so it's June and you're thinking about your summer travel plans; and you're waiting for the word from us on the ways to save gas and still make those trips.

Sorry. We could give you that stuff, but we won't. We could also talk about the new recreational vehicles that contribute to better fuel economy. However we're going to give that industry more development time by not writing about them.

In your planning for this year's vacation, keep these things in mind:

- Leisure travel consumes more fuel than any other use.
- We probably don't have to remind you, but we will anyway: Gasoline is in a limited supply, and that supply dwindles over the summer months because of the amount of auto travel.
- And you're certainly aware that it just keeps getting more expensive.

With these considerations in mind, why not decide to vacation at home? Think of the advantages: Not only do you save money in gasoline *not* bought, but also in motels *not* used. Think of it. There's no problem of getting used to the water. The food is much better at home – none of those greasy spoon diners! No endless hours of driving with a carload of

kids, suitcases, sweaters and tissue boxes.

You're worried about keeping the kids—or yourself—entertained? Pull out the slides of last year's visit to Yellowstone, or the trip to Miami from the year before that. You want new sights? Trade slides with the neighbors and look at their trip to the Great Lakes or the Redwood Forest. If nothing else, laugh at their picture-taking ability.

Okay, maybe we can't talk you into a vacation without any travel. We certainly don't want to cause a slump in the tourist trade across the country. But try a variation on the stay-at-home theme: Vacation *close* to home.

If you're in upstate New York, go to Niagara Falls and not to the Grand Canyon. Let the Southwesterners go to the Indian pueblos. Let the midwesterners visit Lincoln's birthplace.

Despite the savings in time, and money, maybe we can't talk you into that idea either. But at least consider it.

OLD FACEFULL
Visit your very own Civil War battlefield! Wash out your neighbor's barbeque.
MT. FIDO
Watch your canine pal make a mountain out of a mole-hole.
GRAND CANYON OF THE BACKYARD GOPHER
Spend your vacation marveling at the mess this leetle varmint makes.
ROCK THROWING AND KICKING ZOO
Take out your frustrations on that 10-mile-per-gallon dinosaur.
WRECKS

protecting yourself from the DRUNK DRIVER

No matter what hour of the day or night, the drunk driver is always on the road. A report made to Congress last year says at least one driver in every 50 is drunk.

Although many judges are taking a tougher stand about people arrested for driving while intoxicated, plea-bargaining and other legal maneuvers enable drunk drivers to be arrested one day and be out on the street driving again the next, never spending more than a few hours in jail or losing the driving privilege.

There are some things you can do to protect yourself from this menace. Not a lot, but some. It goes without saying that you yourself must be sober, rested and alert, particularly at night. The most critical period is from midnight to 3:00 A.M.

Scan the road in front of you and use your mirrors to spot erratic drivers. If you notice someone making a wide turn around a corner or cutting it so close that he runs over the curb, suspect a drinking driver. There's a good chance that the tailgater has had a few and is feeling bold or has lost his depth perception. Give him room and opportunity to pass you.

The shoulder rider may be keeping the right wheel on the shoulder as a guide. Same thing for the center-line hugger. The painted strip gives him a bit of security. Get away from such drivers.

Be particularly attentive at intersections. Even if you have the right of way, don't take it until you're sure the other car will stop or that you have ample time to clear the intersection before the other car reaches it. Check out the exit ramp as you approach it. Drunks frequently drive the wrong way. Let the suspected DWI have plenty of room and be prepared to yield to the right if he moves in close.

If an approaching car fails to dim its lights after you have flicked yours, suspect an intoxicated driver. Don't try to teach him a lesson by putting on your brights. Chances are he's in no condition to learn anything and if you blind him he may come charging over into your lane. Keep your eyes moving between the center of your lane and the right shoulder so you won't be blinded yourself.

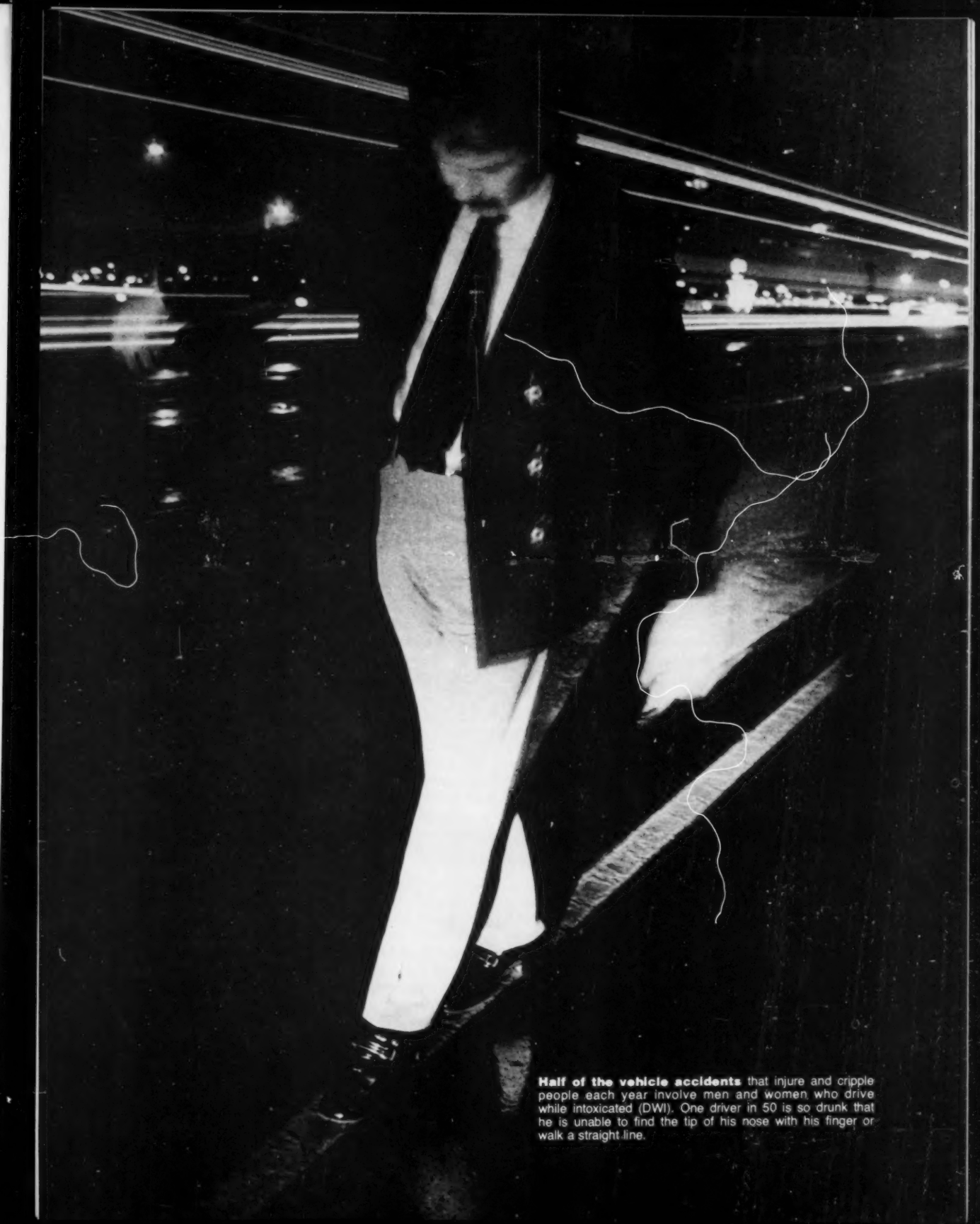
If an approaching car is in your lane, get on the shoulder, then flick your lights. If he's not too far gone, this may get him to move back into his lane. But use the horn with care. A long, loud blast could startle a drunk driver and cause him to swerve or stop completely. Remember to stay *right*, even if it means the ditch. A head-on collision must be avoided. Don't move into the on-coming traffic lane – the drunk driver may get his car back in his lane just in time to collide with yours.

When you're stopped at a red light, watch the rear-view mirror for a car bearing down on you at high speed. Flicking your tail lights may get his attention. This is a particularly dangerous spot to be in because you could be knocked into cross traffic. Make a habit of checking for emergency outs to the right, such as service station entrances, vacant lots, driveways – anyplace you could go to avoid collision.

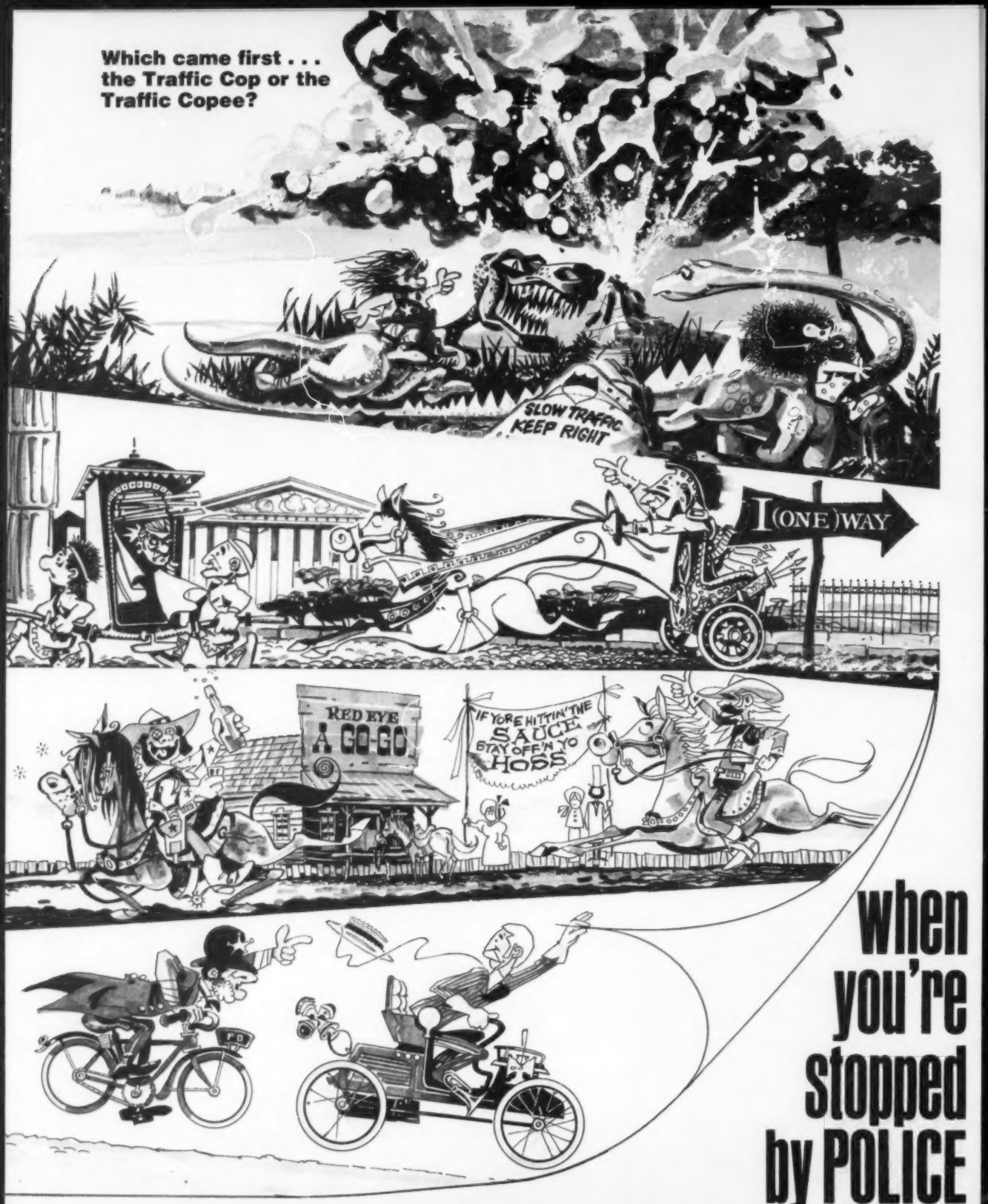
If a car in front of you is weaving or taking other erratic action, stay well back until you are positive you have plenty of passing room. Think seriously of changing your route rather than sharing the street with a DWI.

Some drunk drivers become super cautious. Others – probably more – become super confident and want to play games with other traffic and show off. By all means, keep your temper. Never let a foolish drunk goad you into a drag race or any other "contest."

Drunk drivers are killing 25,000 people a year on our highways. That's double the number who die as victims of violent crimes. We may be able to lock our doors and windows against the armed robber, but we haven't learned to lock the drunk driver off our roads. Take care of yourself!



Half of the vehicle accidents that injure and cripple people each year involve men and women who drive while intoxicated (DWI). One driver in 50 is so drunk that he is unable to find the tip of his nose with his finger or walk a straight line.


Which came first . . . the Traffic Cop or the Traffic Copee?
SLOW TRAFFIC KEEP RIGHT
I (ONE) WAY
RED EYE A GO-GO
IF YO'RE HITTIN' THE SAUCE STAY OFF'N YO HOSS
when you're stopped by POLICE

If you drive a car or ride a street motorcycle, sooner or later it's going to happen – flashing lights signalling that a traffic policeman is pulling you over. Naturally, you will move to the shoulder or curb as soon as it is safe to do so.

Right now we're going to say something you might just think is the funniest thing you've heard today. Don't do anything the officer might consider menacing! Keep your hands in plain view as he approaches you. If you're a motorcyclist, stay at the bike rather than walking back to meet the officer.

Traffic police run into a lot of flakes these days. Not just drunks and drug-users but ordinary-appearing drivers who pull guns or knives on them. *You* know you're a law-abiding tax-paying citizen in good standing, but that fact isn't painted on your forehead. The officer learned long ago not to take too many chances.

You can be reasonably certain that you have been stopped because you have broken a traffic law or because there is something wrong with your vehicle, such as brake lights that aren't working. The Supreme Court ruled last year that police may not stop cars for routine checks. A police roadblock is an exception, of course. In that case, all traffic can be stopped.

If you have committed a traffic offense, such as an improper turn, you are not going to be arrested. Your punishment will be a fine. There are some more serious offenses – such as reckless driving, drunk driving, or driving with a suspended license – which are misdemeanors and are cause for arrest in most places.

There are a few very serious violations which are felonies, such as having an accident while drunk. Felonies always mean arrest.

It is important to understand this because unless the offense is one for which an arrest could be made it is not legal for the officer to search you or your car. If the officer asks if he can look in the trunk, you have a right to say no. Since you have nothing to hide, it might be simpler to let him look and complain later to the department he represents.

Even during an arrest, it is illegal for police to search your car or any of its contents unless the car is seized for inventory purposes. But the arresting officer may frisk you or go through a handbag or other container that is *within your reach*. Again, this is self-protection for him since there may be a hidden weapon.

One word of warning, particularly to the woman driver who is stopped in a remote area, perhaps after dark, and is alone in her car. Keep your doors locked and windows up until the officer is in full view and you are satisfied he really is a policeman. You may ask to see a badge or official ID before rolling down the window.

No matter how careful and attentive we are to our driving or riding, everyone occasionally commits a traffic violation for which we would be ticketed if seen by a traffic officer. Who hasn't been moving along in a 35 mph zone and suddenly noticed the needle a lot closer to 45? Or misjudged a light and found himself in the middle of the intersection on the red?

If you're caught it can mean a fine and that hurts. But there's no point in arguing with the officer. If you honestly feel you were in the right, go to traffic court and tell it to the judge. The overwhelming majority of traffic police will be as courteous and considerate of you as you are of them.

One final word: All of this applies in the United States. If you are driving or riding in another country, know the local laws. Don't count on having the same rights you are guaranteed at home.

a rugge

Words and photos by SSgt DAVE JONES ■ Randolph AFB, TX

TSgt Jay Pearcy (left) helps check out one of his team rider's bikes. Good preventive maintenance is a vital part of this sport.

(right)
Riders call upon all their physical and competitive skills to maintain balance while barreling around the course. But they don't have to worry about cars turning in front of them!

Motocross! It's a great sport for riders, young and not-so-young, who have a zest for living and are willing to work hard to achieve mental discipline and physical conditioning.

One of the Air Force's motocross enthusiasts is TSgt Jay Pearcy of the 2015th Communications Squadron at Randolph. He sponsors a team of six young men who are making a name for themselves in the motocross world. The team races almost every weekend.

It's a big job, readying men and machines for the weekly trips to Houston, Dallas, Austin and dozens of smaller towns. Pearcy, an air traffic controller, devotes most of his free time to it. And it's a labor of love.

Pearcy does most of the maintenance on these racing machines himself and that alone takes a lot of time. Each bike gets a three-hour maintenance and safety check-up before it races. Pearcy's skill has been honed by years of automotive racing experience. He's raced against some of the best – A.J. Foyt and Parnelli Jones to name just two.

The team has done well for itself since it began a little over a year ago. Four team members recently competed with top riders from across the nation in the Grand National Championship in Houston's Astrodome. Of the 1,486 riders entered, just 286 made it to the finals. Three of Sgt Pearcy's riders were among them, riding as they had been trained: To win.

When the dust had cleared, Glen Muehlstein had taken a respectable fifth place in the open intermediate class. It was the climax of a year of racing.

"It's a long way from San Antonio to the Astrodome," says Sgt Pearcy. "There's a lot of bumps and grinds, money and time spent. Lots of trials

dsport for COMPETITORS

and tribulations."

Motocross riders must build stamina. It takes strong hands and arms to control the bikes on the rugged courses. Legs act as shock absorbers, soaking up the punishment dealt out by the dirt track's hills and gullies.

"It's a continual thing," Pearcy explains. "Riders must keep themselves at a peak of discipline, self-control and physical conditioning."

Getting the ultimate in performance out of the bikes and the riders is the only way to gain the cherished trophies.

A bike leaps high into the air, a common sight at any motocross race. Lots of bumps, big and little, offer riders a teeth-chattering ride.

Jeff Ellis rests after a motocross race. Although he looks defeated, it's just relaxation after the competition. He won the event.

It isn't always victory. Here a disabled bike is being pushed off the track, as Sergeant Pearcy (center) leans down to try to discover why the engine failed during the race. Note the rider's boots, gloves, helmet.

tteecchh!!
DOUBLE TECH Q A

I read in a recent issue of DRIVER that gas-guzzler cars are supposed to be safer than the small gas sippers because they aren't easily damaged in an accident. This is fine, but you ignored the possibility of better maneuverability keeping small cars out of accidents. Aren't small cars involved in fewer accidents than big cars?

According to the Highway Loss Data Institute for Highway Safety, small cars are involved in more accidents than larger ones. The institute says that for every 1,000 "insured vehicle years," there were 16.7 injury claims for big cars versus 25.4 claims for small cars.

Take your "better maneuverability" statement a step further. Small car drivers may become involved in more accidents because of overconfidence that they can maneuver out of harm's way. Besides, maneuverability – except for getting into a tight parking spot – is a product of tires and suspension engineering, not size.

Sorry. No matter how you slice it, the small gas savers are not lifesavers.

As a woman backyard mechanic I've run into a few problems because I don't have the strength of a man. For one, I can never get my oil filters on tight enough so that they don't leak. Another problem comes when trying to remove spark plugs. And I never have the strength to wrestle a tire onto the hub. What can I do to overcome my strength problem besides ask for help?

I understand that women weight lifters tone their bodies rather than develop bulging muscle such as their male counterparts do. However, since you are already doing your own mechanic work you probably don't have time for working out in the gym.

I've found that most oil filter leaks develop when the seal is not coated with oil before installation. A coat of oil not only makes the filter easier to turn for that last hand-tight twist, but also helps the seal set. With the spark plugs you might remember to spray them with an antiseize compound before installation. If you find you need more leverage, use a longer handle for the socket, or a breaker bar.

As for the tires, think about this. When you remove a flat, you'll notice that you have to jack the car up a little farther to get the inflated tire back on the hub. Lean the inflated tire against the hub – with the holes aligned to the studs – and then jack the vehicle up more. The tire should "fall" into place.

Here's an extra hint for no extra cost. As the Backyard Mechanic pointed out last month, always carry coveralls, leather working gloves, hand cleaner and a rag in the vehicle. The coveralls protect your clothing, while the working gloves protect your hands and are a good substitute for callouses.

I am buying an Americanized Japanese car for delivery in Scandanavia. As in other parts of Europe there is no unleaded fuel. The car will come equipped with a catalytic converter for U.S. emission controls. The ports don't remove the converters or know much about them. Dealer service center mechanics have very little knowledge about emission control systems. I have received so many conflicting stories that I don't know which is correct.

Is it necessary to have the catalytic converter removed? Can leaded fuel be burned without damage to the engine or emission control system? If the catalytic converter has to be removed how much work is involved? If removal is necessary can I do this in my backyard? Some people have said removal is not necessary, just burn it out as you drive. Is this good, bad, or indifferent?

What the whole thing boils down to is, catalytic converters versus leaded fuel.

Although it is not necessary to remove the catalytic converter, it is recommended. Burning leaded fuel destroys the converter and may also cause some other problems. The lead can plug portions of the converter, which will increase exhaust back pressure and reduce engine performance. Some manufacturers indicate that the lead going through the exhaust-gas recirculation system will increase ring wear.

As you can see, leaded fuel is harmful to not only the catalytic converter but other portions of the emission control system as well. Additionally, lead deposits on sparkplugs cause misfiring. Lead elements also mix with water to form acids which contaminate oil and cause corrosion. Therefore, if you are burning leaded fuel in a vehicle designed for unleaded, you will have to tune the vehicle more often as well as decrease the miles between oil changes.

Usually, removal and replacement of the catalytic converter is as easy as muffler replacement – provided you can get a pipe to replace the converter. You'll have to have the dealer service center check back in their parts order system for a replacement pipe by the name of the vehicle as it is used in Japan.

Of course, if you bring the car to the United States, the entire emission control system will have to be reinstated to meet year-of-manufacture pollution standards.

A final word of caution about "burning out" the catalytic converter: "Burning out" can become literal. Leaded fuel may cause the converter to overheat, which can start a fire if the car is parked over dried grass, leaves or other flammables.

When using a battery charger is it necessary to disconnect the battery cables? Some mechanics have been telling me if I leave the cables connected there is the possibility of damaging the alternator and other electronic components of the engine. Other mechanics don't agree. Are you pro or con?

Pro. However, even if I weren't, if I were you I think I wouldn't want to take the chance that the pro people were right—I'd disconnect the cables.

Everything I've ever come across has said, "When using a fast charger, disconnect the battery cables unless the charger is equipped with a special alternator protector." Because slow chargers are intended for out of the car use, the cables have to be disconnected with them also.

Charging a battery reverses the storage cells' normal actions. This reversal causes the damage.

Within the battery, the charging drives the sulphate off the plates and causes it to unite with the water to form sulphuric acid. The ampere hours which have been withdrawn from the battery are replaced by means of the direct current and are stored in the form of chemical energy. This leads to another hazard of battery charging. Since a very flammable mixture of oxygen and hydrogen gases are released, never permit any flame or spark near a charging battery.

Also, the fast charger should never be used to start a vehicle because the rectifiers will be damaged.

In the February '80 "Double Tech" you had a question about synthetic oil, to flush or not to flush. It is my opinion that due to the detergent qualities of this kind of oil, it is best to preflush the engine. Engines build up a lot of sludge and grime, so synthetic oils clean the engine of all impurities and deposit them in the oil filter and clog it up. Then instead of getting 30,000 miles out of the oil filter you will get between 5,000 and 7,000 miles out of the synthetic oil filter. A synthetic oil filter costs between $29 and $60 compared to a $5 crude oil filter. So unless you happen to have a lot of money it is hard to throw away $20, considering the cost of a flush.

Although you didn't ask a question, you and all the parttime synthetic oil dealers who wrote to me about flushing did make it clear that I need to present a pro and con on flushing and let the readers make up their own minds.

You've presented a very pro view, although I have a few questions that I'll save until last.

In the meantime, some of the dealers have a cross between flushing and weaning that they recommend. They suggest changing the filter and adding one quart of synthetic oil. Then drive for a 1,000 miles, letting the synthetic do its cleaning trick. At that point, dump the whole thing—oil and filter—and put on the synthetic filter and fill the crankcase with synthetic oil.

On the con side of the coin you find me. In my book, the filter should be changed between 5,000 and 7,500 miles regardless of what's in the sump, so why go to the extra effort? I will over-state this point: This is in *my* book; you have to make up your own mind on what you are going to do. OK?

Now to my questions about your statements. Everything I've seen and heard says to change the synthetic oil filter halfway through the oil interval. For example, at 12,500 miles if you are going to drive more than 25,000 miles a year (changing the oil at 25,000 miles) or at six months with the oil changed annually. Therefore, I don't buy getting 30,000 miles out of the filter. Furthermore, most warranties are voided if you don't change the oil and filter at the manufacturer's stated intervals. Why press your luck by pushing a filter two to four times further than it was designed for?

Secondly, what automobile synthetic oil filter costs $29 to $60? All I've priced have been from $6.10 to $6.95. Yes, that is more expensive than a discount store $1.98 crude filter, but not that much more expensive.

As for the rest of the readers: Keep tuned, the synthetic oil debate is bound to continue.

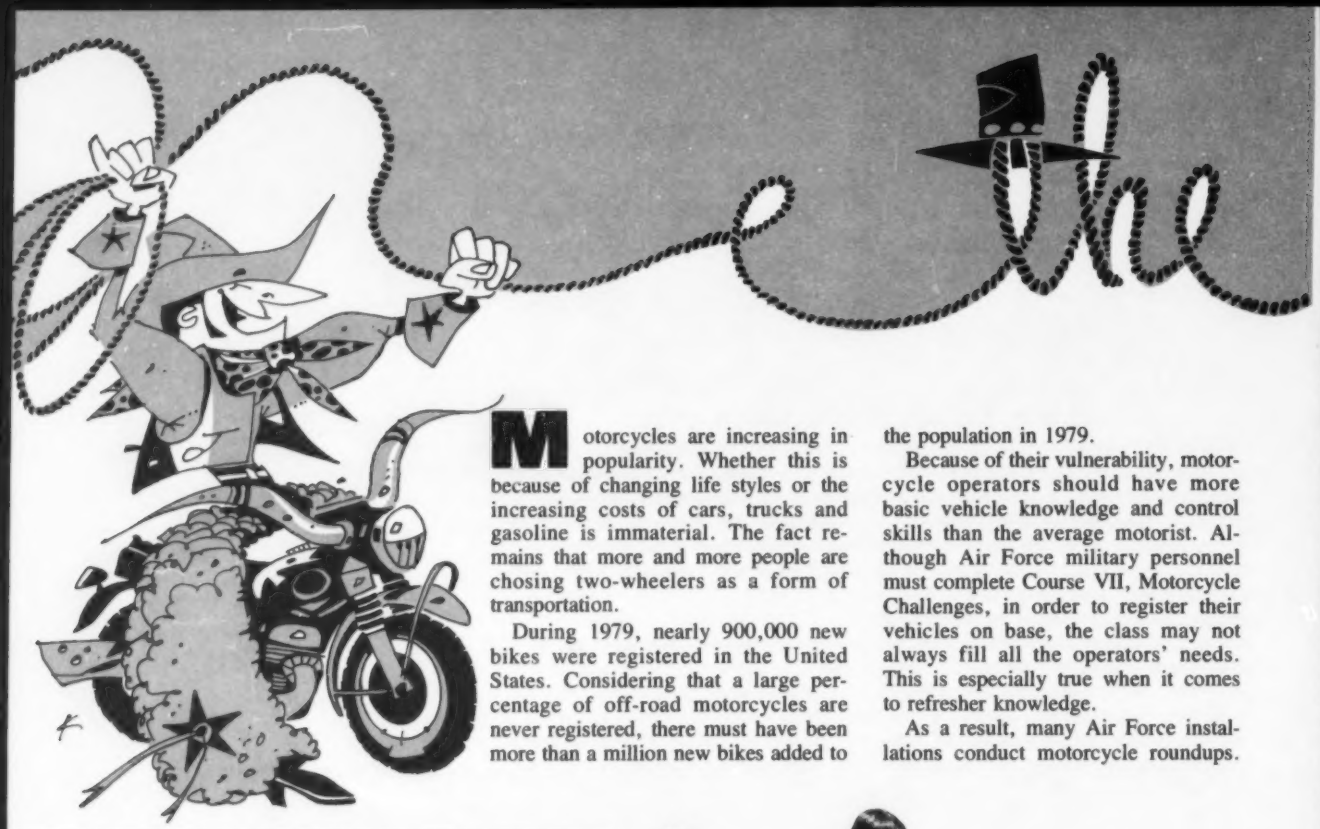
I'm getting transferred and would like to store my car for about 3½ years. Could you advise me on how to do it the right way?

"Operation Mothball . . . Safe at Home," in the March '79 DRIVER covered the subject from bumper to bumper. Check for back issues at your local safety office or installation library.

Editor's Note: Double Tech is a question and answer column in which DRIVER will attempt to make clear some of the cloudy subjects in readers' minds. Unlike other automotive magazine Q&A columns, Double Tech doesn't deal with specific questions such as, "Why is my Wink-Snoozymobile hard to start on a rainy morning?" Instead Double Tech fields questions that are of general interest to the majority of our readers. However, when sending questions to Double Tech be sure to include all available information because this will help in finding the correct solution. If you have a question you'd like an answer to, and you feel others could use the knowledge also, send it to:

Double Tech
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB, CA 92409

As with most magazines, DRIVER has a long lead time between writing and publication, so don't be surprised if it takes several months to get a reply.



Motorcycles are increasing in popularity. Whether this is because of changing life styles or the increasing costs of cars, trucks and gasoline is immaterial. The fact remains that more and more people are chosing two-wheelers as a form of transportation.

During 1979, nearly 900,000 new bikes were registered in the United States. Considering that a large percentage of off-road motorcycles are never registered, there must have been more than a million new bikes added to the population in 1979.

Because of their vulnerability, motorcycle operators should have more basic vehicle knowledge and control skills than the average motorist. Although Air Force military personnel must complete Course VII, Motorcycle Challenges, in order to register their vehicles on base, the class may not always fill all the operators' needs. This is especially true when it comes to refresher knowledge.

As a result, many Air Force installations conduct motorcycle roundups.

Free safety inspections by local motorcycle clubs also provide owner/operators with many helpful maintenance hints.

(left)
Crowds gathered early at the recent March AFB, Calif., Motorcycle Roundup. Dealer displays of the latest machines and safety gear, as well as literature about riding safety and local laws provided by the safety office, are always popular among riders and nonriders alike.

(right)
Everybody listens when local motorcycle policemen talk about safe two-wheel operation.

Motorcycle roundup

These roundups usually cover the full gamut of motorcycling, with something for just about everybody.

Motorcycle dealers display their latest equipment not only for those people who are just considering getting into cycles but for those who are preparing to replace their machines soon.

Conducted by the installation safety office, these roundups also include a full spectrum of safety gear for both the on- and off-road rider. These dealers provide displays including everything from helmets to boots, and all the possible protection and comfort in between.

One of the biggest draws of any roundup is the free safety inspection, usually conducted by members of a local motorcycle club. Not only does this help ensure that an individual's machine is safe, but the club members give the owner many helpful maintenance hints during the inspection as well as a copy of the checklist used.

The real crowd-pleaser for riders and nonriders alike at these roundups is the pylon course. Designed to test the basic riding skills, the pylon course is available for all riders to practice on. However, crowds usually gather early to watch local motorcycle policemen demonstrate proper riding techniques among the pylons. And everybody listens when these law enforcement two-wheelers tell how it's done.

These motorcycle roundups may be soft sells for motorcycle safety, but everybody will agree they are much better than hard falls!

The real crowd-pleaser at motorcycle roundups is the pylon course. Even though the course is open to all riders, the attention-getter is always the demonstration by local police.

An "extra" freebie at the March AFB Motorcycle Roundup was radar clocking by base security police to help riders calibrate their speedometers.

1. Air conditioning was first listed as an available option on a 19___ model _____ _____.

2. Who introduced the first back-up lamp and when?

3. This one is sure to start a fight. J. Frank Duryea built the first successful American automobile. What did he design that completed an otherwise impractical combination of a two-cycle engine and a carriage designed by his brother Charles? Before anybody says anything, yes, Thomas Blanchard built a steam-driven road machine in 1825 and there were many earlier European efforts. Also what year did the Duryeas complete their project?

4. Now discuss the history of the clutch on automobiles.

5. Who introduced the first production limited-slip differential when?

6. The Protex Safety Signal was the first directional light system available. It was introduced in 1920. Who was the first to offer them as a production option and when?

7. Central Oil Company built the first drive-in gas station with a pump island when and where? The first drive-in theater was opened where, when?

8. The headlight dimming switch is finding its way back onto the steering wheel. Who moved it off and when?

9. Fuel injection is becoming standard equipment on more and more cars to curb emissions and improve fuel economy. Who pioneered it when?

10. The combination key-operated ignition switch/starter control was offered first by who, when?

11. The first production station wagon came from:

a. Chevrolet in 1934
b. Ford in 1929
c. Star in 1923
d. None of the above

12. The adjustable steering wheel was first seen on the:

a. 1915 Cadillac
b. 1904 Centaur
c. 1920 Lincoln
d. My dad's company car

13. Briefly sketch the development of the stop sign, automatic traffic light and interlocked signal system.

14. List all the Formula One World Driving Champions and the cars they drove to obtain their title that year.

15. As a test of your general automobile knowledge—describe in detail. Be objective and specific. Abbreviations are permitted. You will be graded for punctuation and grammar.

ANSWERS

1. Packard listed the first auto air conditioner option in 1938.

2. Wills Ste. Claire introduced the first back-up light in 1921. It came on automatically when the transmission was put in reverse.

3. J. Frank Duryea designed the carburetor and ignition system that completed Charles Duryea's design in 1893.

4. Duryea was the first to use a single-plate clutch. Packard and Apperson introduced the first expanding-band clutches in 1904. Peerless had the first cone clutch that same year. Northern pioneered the pneumatic clutch in 1912, while Packard introduced the electromatic clutch in 1938.

5. Studebaker introduced the first production limited-slip differential in 1956.

6. Buick was the first to offer directional light signals as a production option in 1938.

7. The first drive-in gasoline station was built in Detroit in 1910. The first drive-in movie opened in Camden, N.J., in 1933.

8. General Motors moved the dimmer switch to the floor in 1926.

9. Adams-Farwell of Dubuque, Iowa, pioneered fuel injection in 1910.

10. Chrysler Corp. was the first to offer key-operated ignition switch/starter control in 1949.

11. All the dates are correct; however, Star built the first production station wagons in 1923, while Chevrolet was the first with all-steel-bodied wagons.

12. The 1904 Centaur had the first tilting wheel.

13. Detroit used a hand-turned, round stop sign in 1914 with a red light in the center. Cleveland is claiming the first automatic traffic light, also in 1914. Detroit put up the first tri-colored automatic traffic light in 1919. Meanwhile, the first interlocked signal system was set up in Houston in 1922.

STRIKING A DIFFERENT NOTE

1. What type and color car did the "Little Ol' Lady from Pasadena" drive?
2. Name the cities in the "_____, _____ and _____ Sewing Circle, Book Review and Timing Association."
3. What cars raced to "Deadman's Curve"?
4. Who "Shut Down" whom?
5. Describe the "Little Deuce Coupe" down to the most important item.

ANSWERS

1. A shiny red super stock Dodge.
2. Anaheim, Azusa and Cucamonga.
3. A Jaguar XK-E and a Sting Ray.
4. The Corvette beat the 413 Ram Dodge.
5. A flathead mill that was ported and relieved, stroked and bored with a competition clutch and four-on-the-floor. The lake pipes roared, but most importantly the driver "had the pink slip, daddy."

14. 1950, Dr. Nino Farina, Alfa-Romeo
1951, Juan-Manuel Fangio, Alfa-Romeo
1954, Juan-Manuel Fangio, Maserati and Mercedes-Benz
1955, Juan-Manuel Fangio, Mercedes-Benz
1956, Juan-Manuel Fangio, Ferrari
1957, Juan-Manuel Fangio, Maserati
1958, Mike Hawthorn, Ferrari
1959, Jack Brabham, Cooper-Climax
1960, Jack Brabham, Cooper-Climax
1961, Phil Hill, Ferrari
1962, Graham Hill, BRM
1963, Jimmy Clark, Lotus-Climax
1964, John Surtees, Ferrari
1965, Jimmy Clark, Lotus-Climax
1966, Jack Brabham, Brabham-Repco
1967, Dennis Hulme, Brabham-Repco
1968, Graham Hill, Lotus-Ford
1969, Jackie Stewart, Matra-Ford
1970, Jochen Rindt, Lotus-Ford
1971, Jackie Stewart, Tyrrell-Ford
1972, Emerson Fittipaldi, Lotus-Ford
1973, Jackie Stewart, Tyrrell-Ford
1974, Emerson Fittipaldi, McLaren-Ford
1975, Niki Lauda, Ferrari
1976, James Hunt, McLaren-Ford
1977, Niki Lauda, Ferrari
1978, Mario Andretti, Lotus-Ford
1979, Jody Scheckter, Ferrari

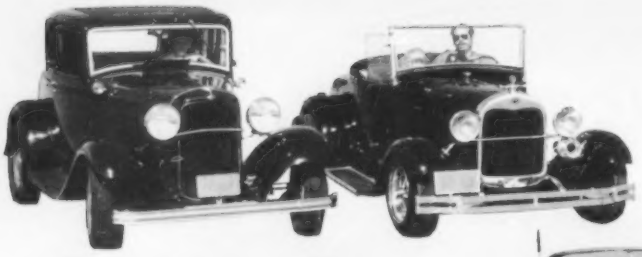
5TH ANNUAL DRIVER TRIVIA NOSTALGIA TEST

The 1952-3 races counting toward the World Championship were for Formula Two vehicles. Alberto Ascari won the crown both years for Ferrari.

15. Put your double-spaced, typed answers (use one side of a page only) in a stamped and sealed self-addressed envelope, inside another envelope. Send this package to:

Curt Testy, Quiz Editor
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB, CA 92409

Your answers will be weighed, graded and returned unopened. Use of a Government franked envelope will result in a minimum of $300 being deducted from your prize money, plus a two-year all expenses paid "vacation" at Fort Leavenworth, Kansas.



Cars can last forever with proper preventive maintenance programs. The newest car in this group was made more than 13 years ago.

how to make your car

It's no secret the price of automobiles is skyrocketing. The last new car with a base price of less than $4,000 disappeared from the American scene in April. Meanwhile, inflation keeps the price of used vehicles even with the original purchase price. Add to this tighter credit controls and many people are finding themselves out of the motor vehicle market.

Only a few people can afford new vehicles every two or three years. Most of us are looking at four, five or six years between trades. In fact the average age of a car on the road today has risen from 5½ to 6½ years old. Even then the costs are more than we can actually afford.

If only cars could last forever.

The truth is, they can last forever. Look around. You'll see backyard, shade tree and Saturday morning mechanics keeping 20- and 30-year-old vehicles running. There are also the classic car buffs. And museums discovered long ago that their treasures must be driven regularly because the vehicles deteriorate faster when not used.

So what's the secret to keeping cars looking and running like new for 10, 20, 30 or more years? Preventive maintenance. Preventive maintenance encompassing the entire vehicle; mechanical as well as appearance, both inside and out.

Preventive maintenance begins the instant the vehicle is delivered. If it is a used car, you gave it a complete stem to stern inspection before agreeing to purchase. You should do the same with a new vehicle. Visually check the entire finish for paint chips, thin spots, overspray and even bare metal. Check the chrome for dents, scratches and coverage. Look over the interior for rips, stains or even missing trim. Examine under the hood and the underside for fluid leaks and sloppy workmanship.

Although most new vehicles pass a good quality control before leaving the factory, a lot of damage can happen during shipping. Are there signs of hastily-made repairs?

Everything should be noted by the sales representative and yourself along with an agreement on when and how the repairs are to be made before you take delivery of the vehicle. Get it in writing. This holds true for used vehicles, especially.

There are still plenty of things to do before leaving the dealer's lot. For example, make sure your vehicle has all the options on it that you ordered. Make sure they all work, too. Read the owner's manual and operate everything according to the instructions. It's not fun to run into a blinding rain shower and spend five minutes fumbling for the wiper switch only to find out they don't work.

Read and fully understand the warranty. And don't forget to ask about getting an extended warranty. It's really short-term insurance that can take you beyond the 12-month/12,000-mile manufacturer's limit until the vehicle is almost paid for. Kidding aside, the $25 deductible maintenance agreement is usually worth every penny in peace of mind.

Make sure all the paper work has been correctly completed before driving off the lot.

It should go without saying, but here goes anyway: Check the engine oil, transmission fluid, brake fluid radiator coolant, battery electrolyte and power steering fluid before driving the vehicle away. Check them again at the first gas stop. And don't forget to check the tire pressures. As a rule they are never correct. Use your own gauge, not just because the ones on the pump are never correct, but because your own gauge will give you the same constant pressure check.

You'll need at least two books in addition to those that came with your vehicle. One with words and pictures already on the pages, one without.

The pre-printed book is a shop manual or independently-published version. Even if you don't do your own maintenance, these manuals provide insight into the how's and why's of vehicle operation as well as maintenance. Besides they offer a great deal of trouble-shooting help in emergencies.

The blank-page book will become your vehicle's log. In it you will record gas, oil, parts and option purchases in addition to maintenance dates and mileages. These records will provide you with data about the mileage you're getting, when maintenance is due and

last FOREVER

Car covers that are water repellant, not water proof, are best because they allow the finish to breathe.

other projections from past costs into future expenditures. This log should fit into the glovebox. Although you will develop your own way of recording entries, the article "A Case for the Log," in the March 1979 DRIVER will provide a good starting point. Since you're planning on keeping this vehicle forever, you may even record washings and waxings.

With a pre-owned vehicle, you are going to want to completely clean the engine, engine compartment, drive train and chassis before going too far. A spray-on water-soluble degreaser and running warm water should remove most of the dirt. A small wire brush can be used to remove rust from the exhaust manifold. Stubborn stains may require the use of lacquer thinner on a soft rag.

With the engine, its compartment, the drive train and chassis completely clean, check for leaks, oil stains, rust and signs of neglect. Repair these before attempting any further cleaning or appearance doctoring.

Small cans of spray paint available at all auto parts stores, including the large discount chains, make engine finishing easy. Make sure the paint used on exhaust manifolds, mufflers and exhaust pipes is rated for very high temperatures. Polish chrome or aluminum parts with paste cleaner. And coat all unpainted metal, rubber and plastic with silicone spray. Allow the silicone to dry and then buff with a soft cloth. Periodically respray these surfaces with silicone.

You will want to paint, polish and silicone new cars as well.

While rustproofing isn't pretty, it is necessary. If you have a new car's underchassis, engine compartment as well as the insides of doors and fenders sprayed within three months of purchase, it will usually be guaranteed against rust for three to five years. Because these self-healing goos stay soft forever, they make working under the vehicle messy. Therefore, be sure to get all your underside work done first.

Now to that beautiful exterior that everybody sees. Cover all exterior paint and chrome with a paint sealant. This silicone compound prevents air from oxidizing the paint. The base coat sealant must be put on before any wax has been applied. If the vehicle has already been waxed, the wax will have to be completely removed with a solvent. After the base sealant coat is applied, there is a conditioning coat that must be put on every six months. It's as easy as washing and waxing.

With older cars you'll want to remove dead paint with a polish, not rubbing compound. Abrasive rubbing compound can remove all the paint, leaving nothing but bare metal. Be especially careful around striping because even polish can remove these from the paint.

You'll also want to take care of all those nicks, clips and scratches before applying silicone. Be sure to completely clean the area to be touched up of all dirt and old wax or silicone. Use a small No. 1 or No. 2 artist brush, building the paint up in layers. If you get a lacquer paint you can wipe off any mistakes.

Alloy wheels should be cleaned with specially-made wheel cleaners, usually available from wheel makers. To protect wheel appearance, use heavy-duty wheel wax or two coats of silicone spray. Also spray both sides of the tires with silicone as well as silicone-spraying rubber bumpers.

At least once a month you'll want to wash the entire car with a mild soap and warm water. Always rinse the surface completely and dry with a turkish towel. Be sure to clean off road tar and other stains. The solvent that rustproofer gave you to clean up his

continued

overspray works best. Touch up any new dings or scratches, finishing them over with sealant conditioner or bolster.

There are several good vinyl cleaners and conditioners on the market for vinyl roofs. Remember to silicone them when you're done.

Window glass is always cleaned with an ammonia glass cleaner and paper towels.

If you are using a wax, rewax every three months. The silicone conditioner is an every-six-months job.

Even if the vehicle is always garaged, get a car cover. The dust in the garage damages the finish. When the car is outside, sunlight, dust, dirt and pollution take their toll on the surface. The best car covers are water repellent, not water proof. Water-proof covers don't allow the car's finish to breathe. Moisture trapped under a cover can blister the paint.

The interior of the car is like the inside of a house; clean it from the top down. Vacuum the headliner or convertible top as well as the seats and carpet. Vinyl headliners, door panels, seats, dashboards and weatherstripping should be cleaned with non-abrasive vinyl cleaner on a soft cloth. Treat all cloth as "dry clean only."

Use a leather spray cleaner for leather. Then replenish lost lanolin with a "hide food." Always completely wipe off excess cleaners, conditioners and saddle soap, especially from cracks, because they can make the hide too soft and it will pull apart. Flexible leather putty can be used to fix cracks and splits.

Preventive maintenance means more than checking items; it means replacing parts before they fail.

Clean doors and door jambs with household spray cleaners. Lacquer thinner works good here for removing grease.

Carpet can be cleaned with cornstarch, a brush and then vacuumed; or with home foam-style carpet cleaners. Grease stains can be removed with ketone or acetone. If you have a spot where the colors don't match, there are aerosol dyes that can be used. Can't find the correct color? Then use acrylic lacquer paint.

If you have real woodwork that has been varnished, clean it with glass cleaner. Household polishes may give a nice shine, but they turn yellow. Use lemon oil finish on unvarnished woodwork.

Interior bright metals such as chrome, aluminum, magnesium, brass and stainless steel are best cleaned with an ammonia glass cleaner. Paste metal cleaners tend to get on everything around the metal, making a real mess.

Now spray everything that isn't fabric (or glass) with silicone and buff. Everything from the dash to the weatherstripping. You may want to use a special leather protectant, but silicone will do the job there also. Wax the door jambs and ends. Use upholstery stain-proofing spray for fabrics.

Use coco or sisal floor mats to protect the carpet. While they don't keep dirt out as well as rubber or vinyl, they allow the carpet to breathe. As with the car cover, moisture won't be trapped under these type mats.

If you are any kind of a backyard mechanic at all, you'll get instruments

Get and keep the Lead Out

Engine survival is based on many factors not the least of which are what you put into it and what you demand out of it.

Even if your car will run on leaded gasoline, use unleaded if at all possible. Lead additive deposits build up on the spark plugs and other internal engine parts as well as in the oil, mufflers and exhaust pipes, cutting each part's life span.

After break-in, use a high detergent oil of the weight recommended by the manufacturer. These oils cling to cylinder walls and bearing surfaces, preventing start-up scoring.

The oil and filter must be changed regularly, whether the vehicle is driven or not. Everyday use contaminates the oil with dirt and partially-burned hydrocarbon resins. Meanwhile, the oil in engines that aren't run regularly breaks down into a gooey sludge that has a high acid effect. And always change the filter with the oil. A dirty filter only contaminates the clean oil.

Perhaps the biggest determinant in engine life span is your driving habits. Stop-and-go commuting to work or driving slowly to the corner store and back are among the worst as far as engine life is concerned. Perhaps the best exercise for your engine is 20 miles of continuous highway driving. This raises the oil temperature to a normal operating range, coats bearing surfaces with oil and lifts the entire block to an even temperature. Heating up the engine and auxiliary systems in this way burns off many of the corrosive deposits. These deposits came from water vapor built up in the system during all those short trips.

This 20-mile exercise will also bring to light problems that may have been overlooked in day-to-day commuting.

Auto hobby shops support the idea that cars can last forever. After all, none of the vehicles in this work area is a spring chicken.

to be backed up by the idiot—pardon me—warning lights. The minimum probably is an ammeter, water temperature and oil pressure gauges. For economical driving you'll probably also invest in a vacuum gauge (see January 1980 DRIVER).

Now is the time to plan your full preventive maintenance program. Not just the routines such as changing the oil every six months, but a full-scale plan. The plan should span as long as you intend to own the vehicle.

Where do you start? With the manual you bought. In fact, many independently published maintenance manuals already have such programs in them. Other good sources of information about what-to-do and when-to-replace are service managers and mechanics who work on your type vehicle. The 10-year maintenance plan on these pages reflects the average life of conventional front-engine/rear-wheel-drive American-made vehicles.

The idea with these "lifetime" maintenance programs is to replace parts a few months before they fail. This not only brings you peace of mind, but such replacements are usually cheaper than service on items that failed while in use.

With many replacement items, it is far more economical to buy top quality units than their less-expensive equivalents. Take high-quality shock absorbers that last 100,000 miles instead of the 10,000-mile life span of original equipment shocks. Besides having to be replaced less often, the $40 units provide a smoother ride and better handling than the $10 ones. A top quality $100 clutch will last three or more times longer than a $50 unit.

The same is true when it comes to batteries. And the real bargain in keeping a car "forever" comes with "lifetime" mufflers. We all know that no muffler will last a lifetime, but you'll get free replacements.

Carry this theme over into buying new units instead of rebuilt replacement items.

It is also better to do "system" replacements rather than unit repairs. When you buy a new battery, replace the cables, too. While replacing the brake linings, why not take care of the wheel bearings and wheel cylinders at the same time.

Remember, the idea is that it is cheaper to do the maintenance now than wait for the item to break. As with front-end alignments, the $15 for labor is much less expensive than the cost of two or more $100-apiece tires.

Now, stop and compare your car and the care it will be getting with Joe Average's buggy.

In just five years, Joe's chariot will be the color of a 1940 sofa, the chrome will resemble a cheap spoon that's been left in acid over the weekend and the interior—well, to put it mildly, the interior will be a royal mess. Joe will be viewing expensive repairs such as tires, brakes, battery, exhaust, catalytic converter, etc., as if he was on the business end of a sawed-off shotgun. Joe will gladly opt for a new $10,000 car instead of $1,000 to repair the old rattletrap.

Meanwhile, your wheels look like they just rolled off the showroom floor. You aren't faced with any repair bills that you haven't already taken care of or at least programmed into the budget. And, if you were lucky enough to buy the right car, your vehicle is increasing in value every year. To top all this, you can continue to drive your car for the next five years of more—for free.

Sure, at the end of 10 years the car might need a $450 paint job (don't get the $69 paint job because it looks like what it is—a cheap paint job) and a similar expenditure for chrome to make it look showroom fresh. But by then Joe will be on car number three and you'll still have that sharp pseudo-classic.

Remember, most cars are junk by age 12; but not those that got preventive maintenance and lots of tender loving care.

continued

Whenever you are working on your vehicle's painted surfaces, use clean turkish towels only. Yes, last year's beach towel qualifies if it is clean, soft and has a deep nap. The deep nap lifts any particles away from the paint, preventing scratches. Use only one side, and get a clean towel when the one you're using is dirty. Always work in small areas, using steady, medium pressure with long arm-length strokes in line with the vehicle. Never use a swirling motion.

Chamois should be used only on a surface that is completely free of any dirt or particles. If you just washed, rinsed and dried the car and want to wet it down again, then you can use a chamois. Otherwise you may scratch the surface.

continued

The 10-year or 100,000-mile plan

This maintenance guide reflects the average life span for a front engine/rear-wheel-drive American sedan. It is only a reference point from which you can develop your own lifetime preventive maintenance program.

WEEKLY
Check:

- Engine oil level
- Tire air pressures
- All exterior lights
- Brake operation
- Emergency brake operation
- Horn

MONTHLY
Check:

- Battery fluid level
- Windshield washer fluid level
- Coolant level
- Airconditioner belt
- Tire wear
- Brake fluid level
- Power steering fluid level
- Power steering belt
- Spare tire pressure

If you haven't been using the air conditioning, run it at full for at least five minutes.

SEMI-ANNUAL OR EVERY 7,500 MILES
Check:

- All drive belts
- Starter connections
- Alternator connections
- Radiator hoses
- Clutch play
- Radiator cap pressure
- Manifold heat valve
- Air conditioning system for leaks
- Air conditioning refrigerant level
- Windshield wiper blades
- Windshield washer system

Replace:

- Engine oil
- Oil filter

Lubricate:

- Front suspension

Adjust:

- Timing

Rotate:

- Tires

Put a coat of conditioner or wax on the exterior of the vehicle as well as respray everything with silicone.

ANNUALLY OR EVERY 15,000 MILES
Check:

- Entire brake system
- Tire tread depth
- Shock absorbers
- Engine mounts
- Steering linkage
- PCV Valve
- Sparkplug wires
- Rear axle fluid level

Replace:

- Sparkplugs, points and condenser (not on CDI systems)
- In-line fuel filter
- Windshield wiper blades
- Coolant, after flushing and back flushing radiator and block separately

Lubricate:

- Universal joints
- Shifting linkage
- Wiper linkage
- Hood release
- All body hinges

Adjust:

- Dwell
- Clutch pedal free travel

Clean:

- Air filter

EVERY TWO YEARS OR EVERY 30,000 MILES
Check:

- Emission-control system

Replace:

- All drive belts
- Air filter
- Sparkplug wires
- Distributor cap and rotor (not on CDI units)
- Crankcase breather air filter
- Transmission lubricant and filter

Adjust:

- Automatic transmission
- Front suspension and steering
- Automatic choke

EVERY THREE YEARS OR EVERY 40,000 MILES
Check:

- CDI for voltage output
- Wheel bearings; always repack and replace seals

Replace:

- Radiator cap
- All hoses
- PCV Valve
- Differential gear oil
- Original equipment shock absorbers

A car with a different schedule

Older cars need a lot more attention than newer models, besides not being able to go as far between routine maintenance such as oil changes and tune-ups. Here are a few hints to help you establish a maintenance schedule for these vehicles.

After an engine overhaul, change the oil and filter at 500 miles, and then at 3,500-mile intervals or at least annually.

Think about fitting an electronic ignition to increase performance as well as part life.

While ball joints, control arm pivots and tie-rod ends should last 100,000 miles, the grease does get contaminated with dirt and water. Install grease fittings in those vehicles with "lifetime" lubrication systems, and lubricate the front suspension every 7,500 miles with the highest quality molybdenum disulfate lithium grease. It wouldn't hurt to repack the wheel bearings then, either.

Replace manual transmission and differential gear oil every 30,000 miles. Because automatic transmission fluid has a harder life, replace it and the filter every 15,000 miles.

EVERY FOUR YEARS OR EVERY 50,000 MILES
Replace:

- Battery and cables
- Coil
- Brake linings, wheel cylinders and master cylinder
- Tires

EVERY FIVE YEARS OR EVERY 60,000 MILES
Replace:

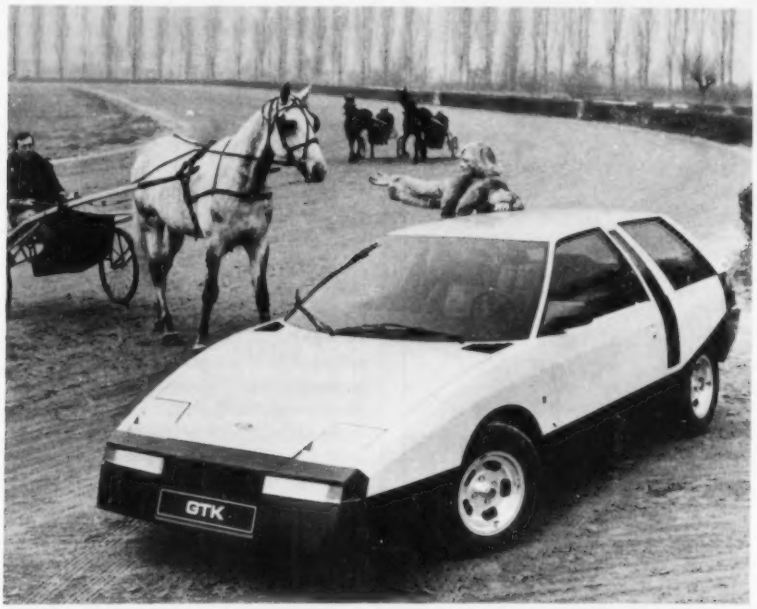
- All light bulbs
- All fuses
- Complete exhaust system including catalytic converter
- Manual transmission clutch

EVERY SEVEN YEARS OR 70,000 MILES
Replace:

- Thermostat
- Water pump
- Fuel pump
- Universal joints

EVERY EIGHT YEARS OR EVERY 80,000 MILES
Replace:

- Wheel bearings
- Ball joints
- Tie-rod ends
- Steering idler arms



If this is your next purchase, we know you'll want it to last forever. With preventive maintenance and lots of tender loving care any vehicle can have a long life. By the way, this is the Ford concept car Fiesta GTK—a station-wagon design with room for a driver, four passengers and their luggage.

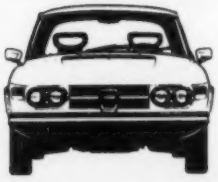
EVERY NINE YEARS OR EVERY 90,000 MILES
Replace:

- Carburetor complete with choke
- Starter and solenoid
- Alternator
- Voltage regulator
- Power brake booster
- Power steering pump

EVERY TEN YEARS OR EVERY 100,000 MILES

You've reached your goal. Even if smaller engines need a complete overhaul at this point, you should still have a car that looks and runs as good as new. It may even serve you for another 100,000 miles or more.

Let the Dealer do it



With most new cars, your first maintenance is due at 7,500 miles or six months. As the car is still under warranty, let the dealer do it, but check to make sure the mechanic actually did it.

Make sure:

- you got a new oil filter
- the drain oil plug is secure
- the crankcase is full
- the coolant level is correct
- the power steering fluid level is right
- the automatic transmission fluid is proper
- there's enough lubricant in the gearbox
- the rear axle has enough of the right weight lube

DRIVER

THE
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FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
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BACKfire
LETTERS to the EDITOR

HALOGEN HEADLAMPS

Your article on halogen headlamps (Feb '80 DRIVER) was informative but I would like to add a caution about the high-powered lights.

While stationed in Germany I had quartz-halogen lights on my automobile and found them quite satisfactory but for one drawback. The big problem I had was that after driving with my high beams if it was necessary to dim my lights it took much longer for my vision to readjust from the extra distance the high beams afforded to the standard distance of the lower beams. This readjustment period is not very noticeable when dimming from standard high beams but became critical at times when I was switching from the halogens. With the advantage of the extra visibility I tended to increase my speed, being lured into a false sense of awareness that comes with the higher candlepower. When it was necessary to reduce to low beams I was dangerously overdriving my headlamp range. It took some time before I learned to use my halogen lights correctly.

SSgt Lance L. Hargitt, USAF
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McGuire AFB, NJ 08641

FUEL ECONOMY

I am an avid reader of DRIVER and naturally enjoy a smirk and boast when some article coincides with my point of view or philosophy.

I have a couple of pet theories that I have never seen in print in DRIVER or other functional magazines, both concerning fuel economy.

(1) The National Speed Limit, 55, has now been in effect for seven years, yet no one or nowhere has there been any effort to curb the horsepower-power train race. The manufacturers are still allowed and are producing engine/power train combinations that boast 110 to 120 and/or 0 to 60 in 5 seconds. Why not put a ceiling and moratorium on the manufacturer; i.e., after 1982 or 1983 maximum speed allowable on any engine power train for highway use will be 65. The extra 10, or maybe 15, could allow for maximum power under adverse conditions—but no more of the 100+.

(2) Carrying this idea even further, I am only a layman but it is hard for me to believe that our engineers can't design and build a transmission/differential that will allow us to get 40 to 60 mph out of an engine.

As a Maintenance Officer I have seen Crawler-mounted equipment (conveyors, ditchers, pole setters, etc.) powered by little 2/4 cylinder engines. Bulk of the power is developed through the use of hydraulics.

Let's allocate some research dollars to develop more efficient engine power train combinations and keep them 65 mph or under.

CMSgt Richard L. Griffin (ret)
2640 Howard Road
Columbus, OH 43207

The main idea behind the 55 mph speed limit is fuel conservation. Legislation increasing minimum Corporate Average Fuel Economy (CAFE) combined with more stringent safety standards allows manufacturers to meet the changing needs of this nation without specific restrictions such as you suggest.

Besides, the technical editor just reviewed all the vehicles available for purchase in the United States. His findings may surprise you. First of all, none of the manufacturers advertise 0 to 60 mph acceleration figures, only 0 to 50 mph times are quoted. Most of the 0 to 50 mph times exceed 8 seconds. In the last two model years there has been only one car that even came close to a 0 to 60 mph figure of 5 seconds (it missed by 0.4 seconds) and it cost more than $45,000! There are only a couple of vehicles that can reach 60

mph in less than 10 seconds. Additionally, most of the cars that get reasonably good gas mileage can't go faster than 90 mph already. Some of the super mpgs can't even reach 80 mph. In fact they're so slow accelerating that it takes them more than 10 seconds to get from 50 mph to 60 mph.

As for your second idea: did you mean get 40 to 60 mph or mpg? The answer to either question is: they can and are. However, enough people don't buy them.

Unfortunately, there is a substantial difference in brute power from small engines via hydraulics and motor vehicle dynamics. However, the tech editor did say there are several organizations working with hydraulic vehicles. Additionally, he pointed out that hydraulic drive, when the flow is reversed or just stopped, makes for excellent braking.

DRY OUT THE AIR

Just a reminder for your readers to help with those misted windows in the car during high-humidity periods. A few minutes of running the air conditioner on closed cycle will "dry out" the air, then you can flip back to the regular defrost function. This works a lot better and faster and is more permanent than trying to dry the air with heat because the air conditioner, on closed cycle without fresh damp air, actually *removes* the moisture from the car.

Mr. R.A. Strong
System Safety Engineer
Wright-Patterson AFB, OH 45433

LEGAL LIGHTS?

The articles "Halogens are Here" and "The Backyard Mechanic" (February 1980 issue) were both entertaining and informative. Many of us need just such information and we have learned to trust DRIVER to present it in an accurate and enjoyable format. However, one aspect of the articles causes me to doubt the sincerity and judgment of DRIVER's staff.

"Halogens" quite accurately states the two-piece type is illegal in the continental U.S.; yet in "Mechanic," there is a photograph of one being installed – and even instructions for aiming it.

Whether a reader is pro or con on halogens is immaterial. The point is: Does DRIVER condone the use of halogens? Do we take the written word literally or do we read between the lines?

AD-1 David S. Wolfe, USN
J.O.O.D. NAS Oceana
Virginia Beach, VA 23460

You take the written word literally. As the Backyard Mechanic said: "Aiming European headlights: For those of you outside the continental United States. . . ." Because DRIVER is circulated to our Armed Forces worldwide, many of our readers do live and drive outside the United States and we must serve them, also. As you say, non-sealed beams are illegal in the United States.

FUEL CONSERVATION AND RACING

I just finished reading the February 1980 issue of DRIVER and would like to add my two cents for what it's worth!

In the "Backfire" section, Colonel Uptmor wrote about "Fuel Conservation." Although I am not a race fan per se, isn't it true that many of the safety devices found in today's passenger vehicles (seatbelts, etc.) can trace their origins to places like Indianapolis and Daytona? Also, aren't things like engine modifications and body design used by automakers to improve their product taken from experiences of race car designers?

In support of your stand in that same issue's "Double Clutch" section, how many times have you seen people commuting to work, alone, in their "home on wheels," replete with flush toilet, shower, etc! Imagine the waste of fuel in that vehicle!

Your magazine's the best – keep it in print.

MSgt Richard Johnson, Jr, USAF
1817 RAS
Griffiss AFB, NY 13441

Some GI sends me a DRIVER every now and then (when a racing article appears) and I write to applaud your "Double Clutch" of Vol. 13, No. 9 (February 1980). Hang in there.

Mr. Chris Economaki
Editor and Publisher
National Speed Sport News
Box 608
Ridgewood, NJ 07451

PARKING VS. RUNNING LIGHTS

In regards to Double Tech's answer to the question of converting the turn signals on a motorcycle to "running lights" and the remarks he made – parking lights versus running lights (February 1980 DRIVER).

I think you should remind your readers that a good portion of the states have laws against driving with parking lights on in lieu of headlights. If it's dark enough to turn on parking lights, it's dark enough to use headlights.

I strongly urge you remind your readers of both the legal and safety hazards involved in driving with just parking lights on.

MSgt Elwood G. Herom, USAF
1117 Brandon Lakes Ave.
Valrico, FL 33594

You're certainly right, and with your letter consider it done. Double Tech made an assumption that everybody knew that "running lights" are used only with headlights and not by themselves. A step further for motorcycles is that many states require them to be operated with the headlight on at all times.

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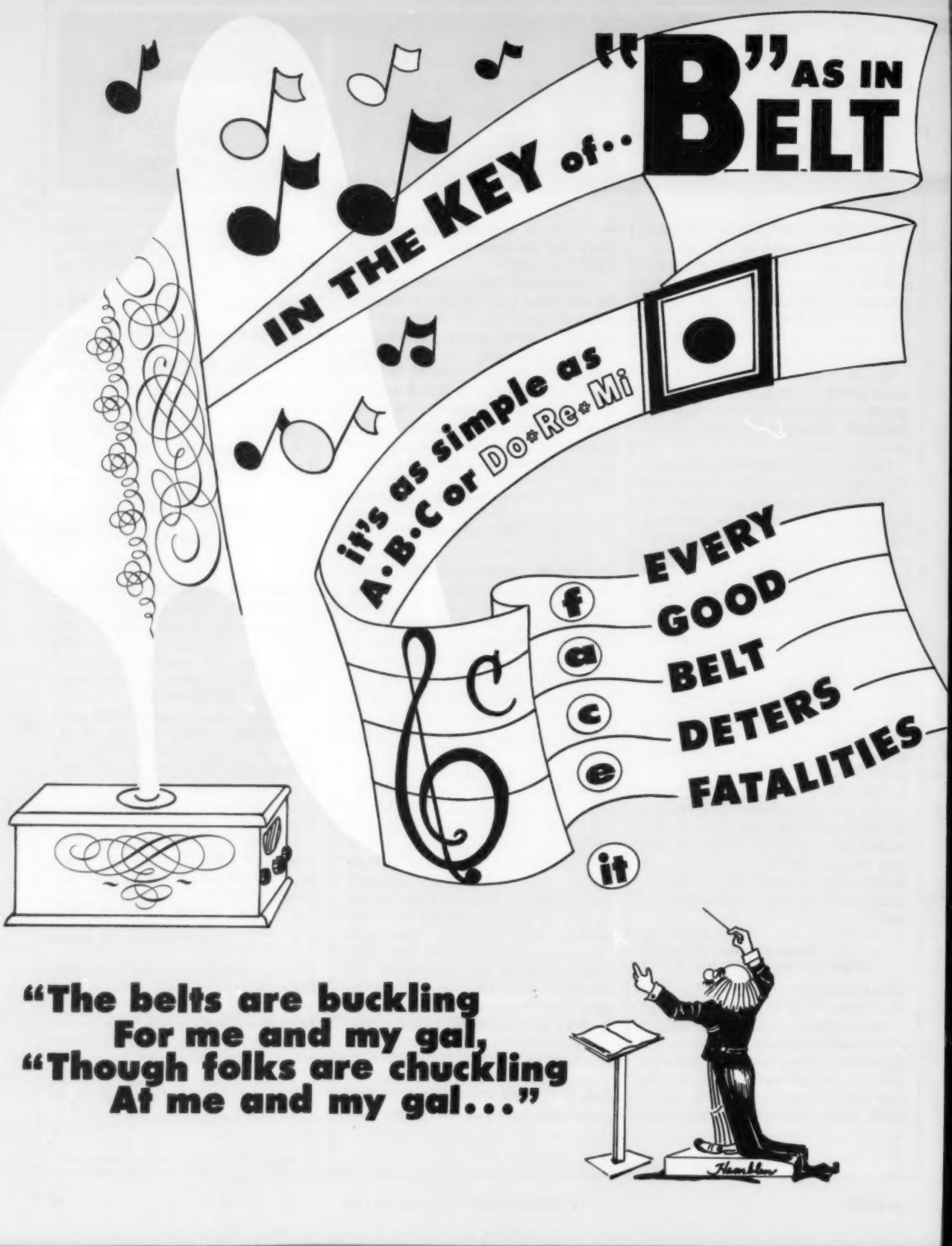
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For me and my gal,
"Though folks are chuckling
At me and my gal..."